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INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) AS AN ENABLER FOR MULTIGENERATIONAL LIVING

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Abstract

How can the implementation of information and communication technologies (ICT) support multigenerational living? In the recent years it could have been observed that the rapidly ageing society is a strong incentive to find new ways to mitigate the risks given by the demographic transformations. An active approach to face these challenges is the concept of multigenerational living, where the exchange of neighborly help within the community based on solidarity is an integral part for the insurance of a supportive system. The need for ICT-based solutions within a multigenerational community cannot be reduced to the quantitative demographic processes. The on-going social changes, success factors of multigenerational living and intergenerational relationships had to be considered. As a result the relevant application areas for ICT were identified as the enhancement of the independence of elderly people, support of organization structures within the community, and the inclusion of external support. Within these areas there is a wide range of existing ICT solutions that can support multigenerational living. For future ICT solutions multigenerational communities can take advantage of the fact that the given social environment may lead to facilitated implementation, especially in regard to the inclusion of elderly people in the information society. This literature review tries to summarize to current results of this subject.

Keywords: Multigenerational living, ict-based solutions, elderly people, information society, independent living

Introduction

This literature review summarizes the results of different publications on the subject of support of multigenerational living with ICT. The western world is facing an on-going demographic transformation. Through higher life expectancies and lower birth rates the demographic ageing is expected to increase significantly within the next decades, which will lead to a major impact on social support systems (BFS, 2008a: 23). In the recent years different concepts have been developed in order to face the negative effects of the demographic change such as shrinking numbers of people in work directly contributing to the economy (real and relatively) or increasing budgetary costs of ageing. Multigenerational living is a concept to actively approach the challenges of the ageing society with support systems that focus on solidarity and intergenerational exchange (Schulte, 2009: 42).

With the opportunities given by the ageing society, for example new markets for innovative products and services for older people, it is assumed that the application of new

information and communication technologies (ICT) will play an important role in mitigating the risks of future demographic changes (Gaßner, 2010: 5; Malanowski, 2008: 5).

This review aimed to summarize current results and to gain a deeper understanding of the relevance of ICT within multigenerational living in regard to the demographic challenges. To answer the question of which supportive ICT solutions can be implemented in different projects of multigenerational living, following steps were taken:

1) Information and literature research of statistical data and studies concerning:

- demographic and social developments in Switzerland
- multigenerational living and intergenerational relationships
- the implementation and usage of ICT in regard to demographic and social challenges.

2) Identifying challenges and opportunities within demographic and social changes, multigenerational living and intergenerational relationships to identify the relevant areas of application of ICT in multigenerational living based on the literature.

3) Outlining of further research questions within the identified areas of application for ICT.

This literature review is organized according to the points above.

Literature review

Demographic and social changes in Switzerland

As in almost all developed countries, Switzerland is experiencing a demographic transformation due to higher life expectancies as well as lower birth rates. A statistic published by the Federal Agency of Statistics in 2008 showed that every new generation was numerically 30% smaller than the generation of their parents (BFS, 2008a: 6). According to the middle scenario A-00-2010 (BFS, 2010: 27 f.) the share of the population of 0 to 19 year olds will decrease from 21% in 2010 to 18% in the year of 2060, while the number of people between 20 and 64 remains stable. At the same time the proportion of people above the age of 65 years will increase from 17% to 28% of the total population. It is expected that the number of people between the age of 65 and 79 years will increase by 53% from 962’000 (2010) to 1’472’000 (2060) and that in same period the number of people above 80 will increase from 382’000 to 1’071’000 (BFS, 2010: 28).

Most elderly people wish to remain in their home environment for as long and as independent as possible (Gaßner, 2010: 14). With the expansion of ambulatory care, different forms of residential care, as well as barrier-free building standards the rate of people above the age of 80 living in retirement or nursing homes has decreased from 22% in 2000 to 18% in 2008 (Höpflinger, 2012: 10). Although the number of people living in retirement and nursing homes has decreased in this period, it is expected that, because of the demographic ageing of the society, the ratio of care-dependent people will increase in the next decades (Höpflinger et al., 2011: 9).

The demographic changes are often in the center of public discussions concerning consequences for the ageing society. Although the quantitative demographic processes affect the development of the housing market, they only gain their relevance under consideration of on-going societal and economical processes (Höpflinger, 2009: 21). The baby-boom generations have different interests in education, living and leisure and a growing tendency to shape their second half of life (50+) more actively than their preceding generation (Höpflinger, 2009: 21). In the stage of life between 50 to 64 years the size of a household is often reduced – for example because of children moving out. Hence, the incomes as well as the expenses per person are above the average of other age groups (Höpflinger, 2011: 7). The so called best-agers are keener to consume and the readiness to buy products or services to improve their living standards is higher than the one of the previous generation (Kimpeler et al., 2006: 32).

A lot of people above the age of 60 don't consider themselves as being "old" anymore (Höpflinger, 2009: 145). This new consciousness of an active ageing has for example led to the shift from "age-appropriate" to "barrier-free" design in the housing industry (Höpflinger, 2009: 144). Barrier-free standards are increasingly implemented in new residential buildings not only to meet the needs of elderly people but also the needs of a wider range of the population. For example a barrier-free access to a building is beneficial for people using a wheel-chair as well as for parents with a stroller. Therefore, it facilitates multigenerational living.The strategy of inclusion instead of exclusion is not only found in the housing industry.

To avoid stigmatization, the concept "design for all" pursues the integration of all citizens into the information society. It consists of three strategies: "(1) Products/services and applications should be usable by as many people as possible - regardless of age, ability or situation - without any modifications. (2) Products should be easily adaptable to different users. (3) Products should have standardized interfaces capable of being accessed by specialized users" (Malanowski, 2008: 25).

Multigenerational living an intergenerational relationship

While other forms of living focus on specific age groups, projects for multigenerational living aim to enable living for a wider range of age groups. It is expected that through the mix of generations, a variety of competences can help to meet the individual needs for assistance in the community and facilitate intergenerational relationships (Höpflinger, 2009: 201). The social and generational mix in these projects are usually tried to be achieved with a wide range of different apartments, community facilities (cafes, rooms for seminars, libraries, workshops etc.) as well as separate outdoor areas for both quiet and more lively activities (Höpflinger, 2009: 152).

In Switzerland less than 1.5% of grandchildren live with their parents and grandparents in the same household (Höpflinger, 2009: 150 f.). A separate living of each generation in different households is the most common form of living. The principal "intimacy on a distance" does not imply a decay of family solidarity. Instead separate living spaces of each generation serves as a base for the quality of intergenerational relationships (Höpflinger, 2012: 11). In fact, living too closely together of young and old is widely rejected by a majority of elderly people (Höpflinger, 2009: 67). Different attitudes and lifestyles meet, therefore integrative forms of living require a high degree of mutual tolerance and acceptance. Conflicts may also arise when the need for assistance or care-dependency is higher than the amount of support the community can provide.

Especially intergenerational relationships seem to be facing a major challenge. The development of extra-familial intergenerational relationships requires time (Höpflinger, 2010: 9). Bühlmann (2012: 298 f.) states that 80% of people between the age of 15 and 44 never work with someone who is above the age of 70, neither on a professional nor a voluntary basis and that almost 60% of the young adults do not have friends or acquaintances who are older than 70. To benefit from the existing resources, projects with a focus on multigenerational living need a certain framework to facilitate neighborly help. The framework can be supported with community workers, contact persons or a "neighborhood club" (Höpflinger, 2009: 152). A factor that can influence the formation of an active community is the creation of a strong identity through which the organizational measures can be minimized (Glockner, 2008: 115). Although assistance provided within multigenerational communities can reduce the need for external help it does have its limitations. For example in case of care dependency the provision of help by professional caretakers remains essential (Schulte, 2009: 65 f.).

Relevant areas of application of ict in multigenerational living

Based on the results of the literature review, the following fields of application were identified, where different forms of information and communication technologies might be implemented as a supportive measure:

(1) Enhancement of independent living of elderly people
(2) Support of the organization structures within the community
(3) Integration of external support

Enhancement of independent living of elderly people

Supporting independence of elderly people is an important element within multigenerational living because it can help to prevent a demand for assistance to exceed the amount of support the community can provide. One of the largest fields of research that focuses on ICT-based products to enable independent living for elderly people in the home environment is Ambient Assisted Living (AAL). Heinze (2011: 161) stated that ambient assisted living was still a topic for insiders in the research and development business. The market for AAL is still undeveloped and most available products focus on “safety & security” applications (Gaßner, 2010: 7). There are several different assumptions, why the implementation of ICT solutions has been slow:

- Technical solutions are often perceived as impersonal and technocratic (Heinze, 2010: 5).
- Missing standards to enable modularity of systems (Gaßner, 2010: 7).
- Relevant partners within the AAL value chain are often not involved (Gaßner, 2010: 7).
- The demand for integrative ICT solutions has been lower than expected (Höpflinger, 2009: 110).

One of the most popular products designed for elderly people, that has not met its expected success, was the “cell phone for seniors” because of its signalization of inability and focus on deficits (Kimpeler et al., 2006: 40). Through a life-long confrontation with technical transformations, the new generation of elderly people shows openness for innovations and also a certain demand for products with esthetical design that show no age discrimination (Höpflinger, 2009: 107).

Highlighting the needs of elderly people, it can be stated that there is a strong demand for ICT- based applications that enhance personal security (Meyer et al., 2008: 86; Höpflinger, 2009: 110). In the home environment, there is a wide range of social alarm systems available that address this demand. The alarms are triggered through a base station or a wireless transmitter that can be worn as a bracelet or necklace. While these systems are limited to the home environment, mobile phones with an inbuilt emergency button, smartphones with an emergency application or "emergency watches" can also be used outdoors. These systems have in common that they require the person to actively trigger the alarm. It is expected that the future technical development will aim to enable a passive detection of emergency situations when the person is either not able to trigger the alarm or not carrying the transmitter. In the pilot-project “REAAL”, different applications of security systems in the home environment, which have found a wide acceptance, were sensors that help the prevention of water damages, motion detectors for automatic lighting at night and systems that can turn off electronic appliances when they are left on (Schneider et al., 2011: 95).

Because of cost and time advantages the distribution of offers for information and services are increasingly concentrating on new media such as the internet (Schelling et al., 2010: 4). The preferred internet applications of elderly people are: sending and receiving e-mails, search of general information, access of timetables and travel information, search of information about public services and authorities as well as health topics (Schelling et al., 2010: 19). While 80% of people in Switzerland between the age of 50 to 59 use the internet

several times a week, the proportion decreases for the age group of 60 to 69 to 59% and for people above 70 to 29% (BFS, 2013). The most common reasons for elderly people not to use the internet are that the usage is perceived as too complicated and that the expected learning effort is too high (Schelling et al., 2010). With the introduction of tablet computers, an improved usability has been already been achieved, though often intensive training and personal support are still required. Two factors that influence a successful implementation of ICT for elderly people are the general technological acceptance, mostly influenced by previous personal experience with ICT, and whether it generates a distinctive added value for the end user. Latter factor is also described as the main factors of acceptability of an information system in the Technology Acceptance Model by Davis, Bagozzi et Warshaw (1989). Thus, the acceptance testing of ICT for elderly people underlie some congruent dimensions as any other information system. The preferred forms of learning concerning the usage of the internet for elderly people are informal help at home, involvement of adolescents or peers and specific training (Schelling et al., 2010: 26). It shall also be considered that the usage of elderly people is strongly related to the use of internet in the social environment (partner, children, siblings, grandchildren and friends) (Schelling et al., 2010: 31).

ICT to support organization structures within the community

The aim of projects that focus on multigenerational living is to promote neighborly help between residents and generations with different needs (Schulte, 2009: 42). ICT solutions that support organization structures within multigenerational living aim to facilitate communication and exchange of neighborly help in the community. In Switzerland exists a large commitment for voluntary work. About 1.3 million people (21% of the population) execute unpaid informal help such as childcare, neighborly help, services as well as taking care of relatives or acquaintances that don't live in the same household (BFS, 2008b: 4). Projects that try to foster this voluntary commitment are so called "time exchanges" which have been realized in different regions of Switzerland. Through web portals of such time exchanges, as the ones for the regions of St. Gallen and Zurich, members are able to create their own profile and publish the services they can provide or the types of services they are looking for in exchange (http://www.zeiboerse.ch, http://www.giveandget.ch). Based on the same idea, similar systems could be implemented in different projects of multigenerational living.

Integration of external support

While multigenerational communities are able to provide neighborly help and assistance based on the principal of solidarity the inclusion of external help and service providers cannot be avoided. The limits of the supportive system in multigenerational living are for example the need for professional assistance in cases of care dependency (Schulte, 2009: 65 f.), emergency situations or when medical attention is needed.

A development that can potentially be beneficial for multigenerational living is the national strategy for "eHealth" which aims to support and connect all processes and relevant stakeholders to enhance efficiency, quality and security in the health sector with the implementation of ICT solutions (BAG, 2007: 2). ICT applications are electronic patient records or health insurance cards (through which treatment relevant information can be accessed by health care providers), online services and solutions for telemedicine (BAG, 2007: 7 f.). While the use of electronic patient records mostly addresses the exchange of treatment relevant information between doctors and hospitals other parties that focus on ambulatory care could be involved. But the majority of doctors are still not able to process their data electronically and a standard for the transmission of medical data has yet to be reached (BAG, 2012: 3).

Conclusion

Projects that focus on multigenerational living try to actively approach the negative effects of the ageing society through the development of supportive communities. But with the on-going demographic ageing and thus a rapidly increasing ratio of elderly people in the next decades it is likely that the supportive systems within multigenerational communities may reach their limits. Aside of the solidary help, additional ways of support especially concerning elderly people have to be considered.

It is assumed that ICT will play an important role in the facilitation of independent living of elderly people. While the initial efforts to develop products for elderly people have been criticized for their stigmatizing design and limited functionality, the findings have shown that the currently available products are increasingly featuring a more "sophisticated" design. The next step in this progression within the concept of "design for all" would be the creation of products and services that are usable regardless of age and abilities.

The internet usage of elderly people is highly dependent on the social environment and the preferred form of learning is informal help at home. A multigenerational community may feature the ideal preconditions to take advantage of these factors in regard to the usage of existing or future ICT solutions. It can be expected that each new generation that reaches a higher age, such as the current "best-agers", will have lower barriers towards the usage of new technology but for now, depending on the previous experiences, the inclusion of elderly people into the information society mostly requires intensive training and support.

Different ICT applications that facilitate communication between the residents may enhance the exchange of neighborly help. But it has to be taken into account that participation does not evolve from the implementation of ICT solutions but from the involvement of people. ICT shall be regarded as a tool that can broaden existing potentials.

The success of multigenerational forms of living in regard to the demographic challenges does not rely on ICT. But the implementation of ICT in combination with social participation can relieve the supportive systems within a multigenerational community and facilitate the inclusion of external help. The writers suggest that further studies within the identified fields of applications (Enhancement of independent living of elderly people, Support of the organization structures within the community, Integration of external support) have to bring further results on precise products that are needed and wanted by elderly people. The literature shows that elderly people ask for the same design and high standard as the common ICT solutions. Therefore, it is suggested not to search mainly for fully new products but to find extensions of existing technologies that fulfill the demands of the end-users: the elderly people. It is further proposed that, based on the Technology Acceptance Model by Davis et al. (1989) and specifically on the results of Schelling et al.(2010) that factors for a successful implementation of ICT for elderly people are distinct added value and general technological acceptance, applied research for future and the development process of ICT solutions for elderly people has to include their involvement from the beginning. Thus, unsuccessful development as the "cell phone for old people" could be prevented.

References:

Age Stiftung (2013). Geförderte Projekte – Mehrgenerationen-Modell. URL: http://www.age-stiftung.ch/Gefoerderte-Projekte.363.0.html?&no_cache=1&tx_ttnews[wf]=12 [19.05.2013].

Bühlmann, F. (2012). Sozialbericht 2012 : Fokus Generationen. Zürich: Seismo.

Bundesamt für Gesundheit [BAG] (2007). Strategie "eHealth" Schweiz. URL: http://www.e-health-suisse.ch/grundlagen/00086/index.html?lang=de&download=NHzLpZeg7t,lnp6I0NTU042l2

Z6ln 1acy4Zn4Z2qZpnO2Yuq2Z6gpJCDdHt5f2ym162epYbg2c_JjKbNoKSn6A-- [27.04.2013].
Bundesamt für Gesundheit [BAG] (2012). eHealth Suisse - Zwischenbilanz der Ziele „Strategie eHealth Schweiz“. Bern: eHealth Suisse. URL: http://www.e-health-suisse.ch/grundlagen/00086/index.html?lang=de&download=NHzLpZeg7t,lnp6I0NTU042l2Z6ln 1acy4Zn4Z2qZpnO2Yuq2Z6gpJCDdH93fGym162epYbg2c_JjKbNoKSn6A-- [27.04.2013].
Bundesamt für Statistik [BFS] (2008a). Demografische Alterung und soziale Sicherheit. Bundesamt für Statistik. Neuchâtel: BFS. URL: http://www.bfs.admin.ch/bfs/portal/de/index/themen/01/22/publ.Document.113897.pdf [02.04.2013].
Bundesamt für Statistik [BFS] (2008b). Freiwilligenarbeit in der Schweiz. Bundesamt für Statistik. Neuchâtel: BFS. URL: http://www.bfs.admin.ch/bfs/portal/de/index/themen/20/22/publ.Document.113375.pdf [14.05.2013].
Bundesamt für Statistik [BFS] (2010). Szenarien zur Bevölkerungsentwicklung der Schweiz 2010- 2060. Bundesamt für Statistik. Neuchâtel: BFS. URL: http://www.bfs.admin.ch/bfs/portal/de/index/news/publikationen.Document.132799.pdf [02.04.2013].
Bundesamt für Statistik [BFS] (2013). Internetnutzung in der Schweiz nach Alter, Entwicklung 1997-2012. April 5th. URL: http://www.bfs.admin.ch/bfs/portal/de/index/themen/16/04/key/approche_globale.Document.25576.xls [15.05.2013].
Davis, F., Bagozzi, R., Warshaw, R., (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Management Science, Volume 35, 1989, pp. 982 – 1003
Gaßner, K., Conrad, M. (2010). ICT enabled independent living for elderly - A status-quo analysis on products and the research landscape in the field of Ambient Assisted Living (AAL) in EU-27. Berlin: Institute for Innovation and Technology. URL: http://www.aal-deutschland.de/deutschland/dokumente/ict_for_elderly_webversion.pdf [02.04.2013].
Glockner, M. (2008). Gemeinschaftssiedlungen: Nutzerpartizipiertes Wohnen im Generationenverbund. Zürich: ETH.
Heinze, R. G. (2010). Smart Living in Old Age: Options and Implementation. In: "Gerobilim – Journal on Social &Psychological Gerontology" (01/10). URL: http://www.sowi.rub.de/mam/content/heinze/heinze/gerobilim_smart_living_in_old_age.pdf [01.04.2013].
Heinze, R. G., Hilbert, J., Paulus, W. (2011). Care Is Coming Home. Towards a New Architecture of Health Service in Europe. Long-term care services in 4 European countries: labour markets and other aspects. Barcelona, P. 147-163 URL: http://www.sowi.rub.de/mam/content/heinze/heinze/heinze_hilbert_paulus_2011_care_is_coming_home.pdf [07.03.2013].
Höpflinger, F. (2009). Age Report 2009 – Einblicke und Ausblicke zum Wohnen im Alter. Zürich: Seismo.
Höpflinger, F. (2010) Intergenerationenprojekte - in Arbeitswelt und Nachbarschaft. Auf dem Weg zu einer Generationenpolitik. Schweizerische Akademie der Geistes- und Sozialwissenschaften. Bern: SAGW: 181-196. URL: http://www.hoepflinger.com/fhtop/Intergenerationenprojekte.pdf [07.03.2013].
Höpflinger, F. (2011). Wandel des dritten Lebensalters. ‚Junge Alte‘ im Aufbruch. URL: http://www.hoepflinger.com/fhtop/DrittesLebensalter.pdf [01.05.2013].

Höpflinger, F. (2012). Haushalten und Wohnen im Alter – im historischen Wandel. In Age Dossier 2012 – Wohnen im Alter: gestern – heute – morgen. P. 4-11. Zürich: Age Stiftung. URL: http://www.age-stiftung.ch/fileadmin/user_upload/PDF/AgeDossier2012.pdf [30.03.2013].

Höpflinger, F., Bayer-Oglesby, L., Zumbrunn, A. (2011). Pflegebedürftigkeit und Langzeitpflege im Alter. Bern: Hans Huber. http://www.bfs.admin.ch/bfs/portal/de/index/news/publikationen.Document.142877.pdf [28.04.2013].

Kimpeler, S., Baier, E. (2006). IT-basierte Produkte und Dienste für ältere Menschen – Nutzeranforderungen und Techniktrends. Karlsruhe: Fraunhofer ISI, München: Fraunhofer-Gesellschaft. URL: http://www.fazit-bw.de/fileadmin/_fazit-forschung/downloads/fachtagung_lt1_gesamttext.pdf [27.03.2013].

Malanowski, N., Özcivelek, R., Cabrera, M. (2008). Active Ageing and Independent Living Services: The Role of Information and Communication Technology. Luxembourg: JRC. URL: http://www.aer.eu/fileadmin/user_upload/MainIssues/Social_Affairs/EY2012/EU_Active_ageing_and_Living.pdf [27.04.2013].

Meyer, S., Schulze, E. (2008). Smart Home für ältere Menschen. Handbuch für die Praxis. Berlin: BIS. URL: http://www.agestiftung.ch/uploads/media/Smart_Home.pdf [20.03.2013].

Schelling, H. R., Seifert, A., (2010). Internet-Nutzung im Alter - Gründe der (Nicht-)Nutzung von Informations- und Kommunikationstechnologien (IKT) durch Menschen ab 65 Jahren in der Schweiz. Zürich: ETH. URL: http://www.mediadesk.uzh.ch/articles/2010/senioren-und-internet--mit-passender-unterstuetzung--geht-ein-drittel-der-offliner-online/BerichtIKT_def.pdf [27.03.2013].

Schneider, U.,Schober, F., Harrach, B. (2011) Ambient Assisted Living (AAL) - Technologien im betreubaren Wohnen" - Wissenschaftliche Evaluierung des Pilotprojektes "REAAL" im Hinblick auf sozialpolitische Zielsetzungen. Wien: WU Wien. URL: http://epub.wu.ac.at/3188/1/Forschungsbericht_REAAL_01_2011.pdf [29.03.2011].

Schulte, E. (2009). Mehrgenerationenwohnen – Eine Antwort auf die Herausforderungen des demographischen und sozialen Wandels?. Hamburg: Diplomica